Book Review Second Half for ICT Seminar
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Book: **Physics of the Future, how science will shape human destiny and our daily lives by the year 2100.**

**Chapter Four: Nanotechnology**

Just like the past, new sets of tools are going to be used to advance the human race into previously unchartered territory and one of these new tools is Nanotechnology. The area of quantum mechanics is opening up technology that a few decades ago would have been in the realm of fantasy. In the early term this will be used heavy with the medical community where we are going to have whole armies of nanobots monitoring our health and doing battle with Cancer and Viruses. When economies of scale and processing come into play they will be essentially throw away and we may even purchasing them over the counter. On the other side of the technological boots will be in the mechanics of computers as we move toward the post-silicon phases of building processors. Using a combination of Carbon Nanotubes and the advancement of Quantum Computers, it will not be long until we can put a computer more powerful than your desktop into your very clothing.

Around the middle of the century the use of nano-echnogy will be bordering on science fiction when a person can use the little bots to basically create anything on a whim. Using the technology to shift the decoration on walls, types of clothing, toys and even your personal devices will be as easy as clicking a button, or thinking it. One could imagine purchasing a bottle of gray goo from the local store. Taking it home and placing it into a printer/computer type of device then downloading the latest fashion or a toy that was just released. The bots will then assume the shape of whatever is downloaded which further points to the future of being more digital intellectually property than the physical.

The books describes that at some point near the end of the century we should have the technology to create the holy grail of nanotech, the replicator. This will shift and change society in ways that cannot even be imagined when a person can order the food they want, the perfect gift, and a precious stone, down to the exact specification the current economy model may start to unravel when money is no longer a driving force in society. The biggest problem may be the lack of energy which is needed to drive the current prediction by the author.

**Chapter Five: Future of Energy.**

Many people have predicted that in the near term the end of oil is going to drive economies to switch to sustainable sources of energy while a more long term solution is developed. The book agrees and sees the use of Solar, Wind, and hydrogen as bridge fuels to the use of nuclear fusion to fully drive the human races need for greater sources of energy. The transportation grid will make the slow, expensive but needed transition to electric and hydrogen driven technologies. The author describes the current projects around the world that are progressing slowly on the creation of a sustainable nuclear fusion reactor. Currently there hasn’t been on that has outputted more power than was initially put into it.

The mid-century mark will be a turning point in the threat of global warming which will become more pronounced as the years go on. The book describes that the burning of fossil fuels for energy will adapt as the planet continues the march towards the fusion. Using methods which either contains the carbon or using natural methods to accelerate the removal of the carbon from the atmosphere the population will gain needed time to make the transition. The books describe the most promising methods at which fusion power will be harness as well as the possibility of a cold fusion breakthrough. There isn’t really an alternative for the future at least by midcentury.

At the turn of the century the use of magnetism will rise considerably if there is a considerable advancement into the realm of room temperature super conductors. The author gives the example that in a modern automobile, nearly all the energy is used to overcome the friction to move the car forward. If there wasn’t any friction the energy needed to move huge amounts of goods would drop considerably. The book details another large possibility in the form of huge space arrays that generate energy and beam it down wirelessly. These solar arrays would be about a mile across and could currently generate more power than a coal fired power plant.

**Chapter Six Future of Space Travel**

The current discovery of extra solar planets may have the possibility to drive a new space program that pushes the human species to the moon and then to other bodies within our own solar system. The future will continue to push the boundaries of what we think we know about space. Already manmade objects are leaving our sun’s influence and large robotic rovers have been on asteroids and currently driving on another planet. The biggest problem with near-term space travel is keeping people alive in space as the human body is quite fragile.

Despite what is being said by many governments it is nearly a given that at some point either a public or private entity will push to mars by mid-century. This also is increasing seen as a private endeavor as the space tourism field starts to expand, and with it brings down the prices for lifting materials into space which currently is very expensive. If one of the many ways to decrease the cost of moving beyond the pull of earth’s gravity are successful, there is nearly no limit to the speed in which space become a normal aspect of human existence.

The future though almost points to a device similar to a space elevator which can cheaply move goods and people to space with little or no cost once built. To achieve this nearly all the other predictions made earlier will have to come to pass as the technology doesn’t exist to make this beyond a physical theory. Once this is accomplishes though the future of space will be beyond our little planet and will push maybe to nearby by starts as early as the turn of the century. There are several ideas which could easily be done today without the cost of getting the heavy technology into space.

**Chapter Seven: Future of Wealth**

The chapter starts by detailing many of the great increasing in human population and wealth, each of which was pushed by a technology which made lives easier. It also details why there are bubbles and crashes in the economies which is because science is not uniform and comes in waves. With each new breakthrough it brings with it a cascade of secondary inventions which continue to drive progress for some time after a new invention. These create vast amounts of wealth which then create the bubble as people speculate about the technology.

As technology continues the winners and losers in the process will be jobs as more and more are automated by robotics and software. This also increases the need and creates demand for other jobs that cannot be automated such as the service and entertainment fields. We are already seeing this as the United States makes the transition from an industrial society to a more service oriented one. Although as movies become more computer animation than live acting the value may be on the voice actors or the programmers.

The far future sees the idea of capitalism being stretched and tested as it already is today in the realm of copyright and trademarks. The books sees this going from what today is a commodity based capitalism to more of an intellectual capitalism. As more becomes automated the value of doing physical labor decreases and it more value is put on what you know than how it is done. As for nation it will no longer China which less than a generation ago where in a state of ruin and now is examples of a modern society.

**Reflections:**

I found the book to be quite interesting and less pessimistic as other books I have read on the future. This gives a real world look at the future with examples of technology that we are working on. I would say that it would be a good read onto the future of communications, and how society may be changed by such advancements. I fear it would become outdated after a few years if the predicted advancements either are disproved or another one is developed. I didn’t like that many of the predications that I would love to see will be outside my lifetime but being alive during this time of change is such a revelation on the future that I wouldn’t have it any other way. Thinking more about it and looking back on the discussions in this class it may be a good choice for someone to ready but not mandatory.

The book almost appears to be a primer to look into different areas. It gives a large overview of many ideas, explains them but assumes that the reader has a brief knowledge on subjects. I found it to be a an easy and good read which caused me to question a few of the assumptions that I have taken when I think about the future. One of the central themes seems to be that in the future the physical side of goods will be almost eliminated in exchange for digital property. The knowing more than someone else will become more important that the ability to build something faster or better. The free flow of ideas has the ability to change society rapidly.